Ministry of Education and Training
Nong Lam University - Ho Chi Minh City
FACULTY OF FISHERIES

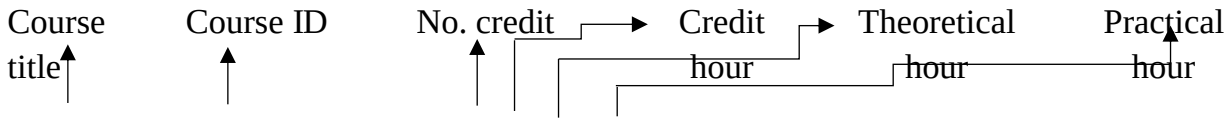
SOCIALIST REPUBLIC OF VIETNAM
Independence - Freedom - Happiness

BRIEF OUTLINE OF ALL COURSES IN THE PROGRAMME

A brief description of each course in curriculum frame are described below. Each course included the title, number of credits, teaching hour, theoretical hour, and practical hour. A brief summary of the course content is also presented.

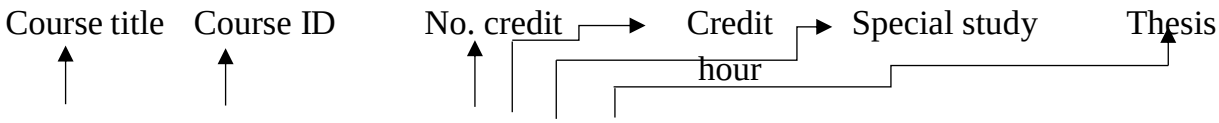
Example:

The notation of the course **Genetics (203203) [3: 45-30-30]** are explained as below:



Genetics (203203) [3:45-30-30]

The notation of the **Minor thesis/Thesis/Special Study (206904) [6: 90-0-90]** are explained as below:



Minor thesis (206904) [6: 90-0-90]

Credit is used to calculate student workload. One credit is equal to 15 theoretical class hours, 30-45 hours of practice, experiment, or discussion, 45-90 practical hours at the fields, 45-60 hours of preparing/writing term paper, project, and graduation thesis. For theoretical, practical, or experimental modules, in order to obtain 1 credit student must spend at least 30 hours for individual preparation.

Credit hour is quantity which used to measure the workload of student. Credit hour is divided into three types base on teaching and learning activities, quantity of time. This is determined as follows:

Credit hour in class	1 hour in class	2 hours for individual preparation
Credit hour for practice	2 hours for practice	1 hours for individual preparation
Credit hour for individual preparation		3 hours for individual preparation

One class hour in credit system is equal to 50 minutes.

4.1 General Courses

4.1.1 Required courses

Philosophy of Marxism and Leninism (200101) [3: 45-45-0]: The worldview and philosophical methodology of Marxism-Leninism; the economic doctrine of Marxism-Leninism on the method of capitalist production; Marxism-Leninism on the theory of scientific socialism.

Political Economy of Marxism and Leninism (**200102) [2: 30-30-0]:** Providing the outline of concepts, categories, economic rules, methodology of economic thinking of Marxist-Leninist political economy as well as providing for students with a systematic, selective basic knowledge of the Marxist - Leninist political economy.

Advanced Mathematics level B1 (202112) [2:30-30-0]: The course includes knowledge of mathematical analysis such as single variable differential and integral calculus, infinite series, and the application of mathematical analysis in aquaculture.

General Chemistry (202301) [3:45-45-0]: General chemistry covers the fundamental chemical and physical principles and their applications to the properties and transformations of materials, including the concept of energy and its uses, atomic and molecular structure, periodic classification of the elements, and chemical bonding. The study of reaction rates and equilibrium is introduced, and redox chemistry is continued and furthered to include electrochemistry.

This course is also an intensive, comprehensive introduction to the chemistry of carbon and its importance to biological molecules. Topics include current ideas of bonding and structure, major reaction mechanisms and pathways, a discussion to determine the structure and stereochemistry of organic compounds. Functional groups to be covered include hydrocarbons, alcohols, ethers, aldehydes and ketones, carboxylic acids, carboxylic acid derivatives, amines, and some of the chemistry of amino acids, peptides, carbohydrates, and nucleic acids.

General Chemistry Practice (202304) [1:30-0-30]: Apply the knowledge of concepts from General Chemistry in an actual laboratory situation; design and perform experiments; determine the rate, order, and activation energy of chemical reactions by varying concentrations and/or temperature; measure concentrations, solubility, and how to set up and use an electrolysis cell.

This course also introduces the student to basic techniques and procedures in isolation, purification, and characterization of organic compounds and simple reactions used in the organic chemistry laboratory. The student will also be trained in the proper way to write a scientific laboratory report

General Biology (202401) [2: 30-30-0]: General Biology introduces students to the fundamental knowledge of cells, the structural and functional unit of life. In this course, students will study: - The structures of cells, how cells interact with each other and their environment - The biochemical activities of cells to see how DNA, proteins and other biological molecules are involved in biological processes. -Gene expression and their involvement in inheritance and development. At the end of this course, students will be able to describe, distinguish and apply basic concepts of cell biology in everyday life and professional activities.

General Biology Practice (202402) [1:30-0-30]: General Biology Practice is designed to complement topics presented in General Biology. In this course students work to: -Be familiar with and use the light microscope to examine cells, tissues. -Investigate the biochemical components of biological samples. -Investigate the effect of temperature on the rate of enzyme activities; of light intensity on photosynthesis; of oxygen on respiration. - Demonstrate osmosis in cells and tissues. - Investigate cell cycles.

At the end of this course, students will be able to: - Follow instruction, safety regulation, and correct manipulation of apparatus. - Collect data, compare the results, interpret the results and draw reasonable conclusions from the results. - Apply technical skills in agriculture, food safety and food technology. - Recognize the role and responsibility of an engineer and have an industrial work manner.

Academic English 1 (213603) [4: 60-60-0]: Review basic grammar sections. New knowledge of exam questions, exam contents, skills for English test at the basic level.

Science Socialism (200103) [2: 30-30-0]: Basic knowledge of sociology, including the history of sociology formation and development; objects and functions of sociology; sociological concepts and categories; some theoretical views on sociology; sociological research methods. Identify, evaluate and resolve positively and scientifically social issues raised in life; contribute to forming correct and stable political attitude; sense of discipline; sense of responsibility, healthy soul, pure.

National Defense Education 1 (theory) (200201) [3: 45-45-0]: National defense-security education is a part of the national education, a fundamental content in building the all-people national defense and people's security; is the main subject in the educational program of the upper secondary school and the professional intermediate training level, colleges and universities.

National defense and security education contributes to the comprehensive education of students about patriotism, love of socialism, pride and respect for the nation's tradition of fighting against foreign aggression. The Vietnamese people's armed forces; have a sense

of vigilance against the plots and tricks of hostile forces; have basic knowledge of the Party's military line and state management of national defense and security; have military skills to participate in the cause of building and consolidating the all-people national defense and people's security, ready to defend the socialist Vietnamese Fatherland.

National Defense Education 2 (practice) (200202) [3: 90-0-90]: Practical skills, techniques, military tactics for the platoon, short-gun using techniques, grenade using techniques and some commonly used weapons of infantry, ready to participate in the strategic task of building and defending the Socialist Republic of Vietnam.

Advanced Mathematics level B2 (202113) [2: 30-30-0]: The first part of the course provides introductory knowledge about linear algebra and some applications of linear algebra in solving the system of equations. The second part equips knowledge about multiple-variable calculus and multivariable differentials. In both sections, we are interested in applications of linear algebra and analysis in real-world situations. This course covers the more advanced aspects of engineering mathematics that are common to all first engineering degrees, and it differs from texts with similar names by the emphasis it places on certain topics, the systematic development of the underlying theory before making applications, and the inclusion of new material.

The course includes the following contents: matrix, determinant, a system of linear equations, quadratic surfaces, functions of several variables, differential equations.

Physical Education 1 (202501) [1: 45-0-45]: Providing student knowledge of Athletics; Principles and methods of practicing Athletics in particular, sport practicing in general.

Academic English 2 (213604) [3: 45-45-0]: Improve and complete basic grammar sections. New knowledge of exam questions, exam contents, skills for English test at the intermediate level.

Introduction to Informatics (214103) [3: 60-30-30]: Providing for student basic knowledge of computer science and such software as Word, Excel and internet; helping students understand how to use computer correctly and can apply software in their learning process effectively.

Ho Chi Minh Ideologies (200107) [2: 30-30-0]: This course consists of 6 chapters, providing students with basic knowledge about concepts, objects, research methods and learning meanings of Ho Chi Minh Ideologies; this subject focus on the basis, and process of formation and development of Ho Chi Minh Ideologies; explaining the Ho Chi Minh's Ideologies on: National independence and socialism; The Communist Party of Vietnam

and the State of the people, by the people, for the people; great national and international solidarity; culture, people; morality.

Mathematic Probability and Statistics (202121) [3: 45-45-0]: Probability and statistics are two closely related fields in mathematics. It is important because of its direct application in areas such as genetics, technology, finance…This course introduces probability theory and statistics. Topics covered are probability axioms, conditional probability; Bayes' theorem; discrete random variables, probability generating functions, standard discrete distributions; continuous random variables, uniform, normal, Cauchy, exponential, gamma, and chi-square distributions, random sample, parameter estimation, statistical hypothesis testing, and correlation and regression.

History of Vietnam Communist Party (200105) [2: 30-30-0]: The Vietnam Communist Party History module is part of the knowledge block, providing students with a systematic and knowledge base about the life of the Communist Party of Vietnam and the revolutionary leadership process from 1930 to 2020. Beside the introductory, the course content 3 chapters:

- Chapter 1st: The life of the Communist Party of Vietnam and its leadership in the struggle for power (1930 - 1945).
- Chapter 2nd: to lead the two wars for complete independence, reunification (1945 - 1975).
- Chapter 3rd: the national leadership's transition to socialism and the process of changing companies (1975 - 2020).

Swimming* (202503) [1: 45-0-45]: This course provides students with an overview of the history of sport development and the Olympic movement, the benefits of physical training and the principles and methods of physical training. Swimming is the most enjoyable and rewarding sport that anyone can participate in. Swimming is not like running, cycling, lifting weights or other activities, because it is ideal for all ages or fitness levels. No other sport can surpass swimming in helping to strengthen the whole body, calm the mind, improve breathing, stimulate circulation and do not strain the joints.

Introduction to Vietnamese Law System (202622) [2: 30-30-0]: General law is a basic science subject, aiming to provide learners with general knowledge, basic, main and most general knowledge about the State and the law. This course will provide students with basic knowledge on: i/ Knowledge of the practical law of the basic legal branches of the Vietnamese legal system and international law as well as the implementation of the law and handling of violations of the law; ii/ Helping learners create a foundation for the study of other specialized legal sciences and contribute to improving the legal culture and legal consciousness of citizens, voluntarily implementing the law, living habits and work in

accordance with the Constitution and the law; iii/ Know how to choose behaviors and assert their autonomy in social relations, at work, in daily life as well as know how to protect their own legitimate rights and interests.

4.1.2 Elective courses - accumulated at least 4 credits

Analytical Chemistry (202302) [2: 30-30-0]: Analytical chemistry course is to introduce qualitative and quantitative chemical analysis of organic and inorganic compounds in common sample matrices like water, air, and soil. This course will provide students with a broad understanding of the different steps in the analytical process such as sampling, sample preparation, chemical and instrumental analysis, evaluation, interpretation and reporting of analytical results. Furthermore, this course also includes the theoretical principles and important applications of classical analytical methods within titration such as acid/base titration, complexometric titration, redox titration, precipitation titration, and various techniques within gravimetric methods, spectrophotometric methods.

Analytical Chemistry Practice (202305) [1: 30-0-30]: The laboratory course provides hands-on experience in quantitative analysis. After experiments, the student could be able to: i/ Understand the theoretical principles and important applications of classical analytical methods within titration such as acid/base titration, complexometric titration, redox titration, precipitation titration, and various techniques within gravimetric methods, spectrophotometric methods; ii/ Perform classical analytical experiments and making observations and assessments of important factors that could affect the analytical result, iii/ Be familiar with calculations in analytical chemistry and perform statistical evaluation of results from classical chemical experiments. - Make scientific reports from chemical experiments and present the results in a transparent manner; iv/ Give a general understanding in how to work safely in the laboratory.

Biodiversity (202403) [2: 30-30-0]: The course will provide learners with basic content such as concepts, structure, function and characteristics of genetic, species and ecosystem diversity. Learners will know how to understand the characteristics of the taxonomy and arrangement of species, taxon and taxa. Moreover, learners can understand the role and value of biodiversity for aquatic ecosystems, ecological environment, and human habitat. Finally, learners will analyze the causes leading to biodiversity degradation and effectively apply the forms of biodiversity conservation. From the equipped content, learners can apply knowledge in aquaculture practice and protect environmental resources for sustainable development.

Introduction to Sociology (202621) [2: 30-30-0]: Sociology is a science that studies the general laws of the existence, operation and development of society, social relationships, and the interaction between the basic components of society. Study society

as a whole. Explain and analysis of basic concepts such as culture and society, socialization and social interaction, social groups and organization, inequality and social stratification, etc. Society Science provides people with knowledge and understanding of: social things and individual behavioral patterns, the workings of the social systems in which we live, helping us to understand why social change and how to change society. Throughout the sociological research methods, provide student the methods of conducting a sociological investigation, about the methods of information collection; Based on theories and acquired knowledge, sociology equips learners with scientific knowledge about social fields and skills to apply them to research and solve real problems.

Communication Skills (202620) [2: 30-30-0]: The course is designed to provide students with basic knowledge by combining practical exercises inside and outside of classroom on the principles of behavior in communication with different contexts, which results in positive attitude and confidence in communication in order to achieve the highest communication efficiency, as well as the influence of this attitude on other objects in the communication process. This module plays an important role in forming one of the soft skills systems for students, contributing to improving career capacity at all levels.

Introduction to Management (208416) [2: 30-30-0]: Provides basic knowledge of management studies applied in business such as: the nature of management, the object of management, the purpose of management, the functions and tasks of management. The course also studies the functions of management such as: Operations and production management, business environment, business decisions, strategic planning, human resource management and some management issue such as: change management of an organization, conflict management, risk management.

4.2 Fundamental Courses

4.2.1 Required courses

General Biochemistry (203104) [3: 60-30-30]: The course provides students with knowledge about the morphology, properties, molecular mechanisms and pathways of metabolizing substances in living organisms such as enzymes catalytic mechanism; tissue respiration; mechanism of photosynthesis in plants; mechanism of transporting substances through cell membranes; supplies and reserves, energy conversion pathways; intermediate stages in the degradation and synthesis of carbohydrates, lipids, proteins and nucleic acids; preservation and transmission of genetic information. With this knowledge, students can easily acquire and understand more deeply the other basic subjects and related subjects such as: Food chemistry, Microbiology, Storage and Food processing, etc. Beside theoretical content, this subject also has practical session to help student approach and become familiar with laboratory activities in the field of biochemistry

General Genetics (203203) [3: 60-30-30]: The course includes content related to genetic structure and materials; replication, transcription and translation of DNA; the interaction and formation of phenotypes from genotypes under the influence of environmental factors; regulating mechanism and gene expression of organisms; genetic changes; genetic engineering and cell technology. The course provides principal genetic so that learners can study other subjects related to this field. In addition, the course has a practical section to help students approach and familiarize themselves with laboratory manipulations in the field of genetics.

Introduction to Fisheries Science (206109) [2: 30-30-0]: This course is designed including following basic contents: i/ Overview on potentials and current status of fisheries sector of Viet Nam, ii/ Basic knowledge on habitat conditions and main bio-characteristics of fish and shrimp species, iii/ Currently major and common aquaculture systems in Viet Nam, and iv/ Basic principles of technologies of seed and marketable production of important cultured animals such as marine shrimps, freshwater and marine fishes. Moreover, the information on technical advances in the fisheries sector of the country is also included to give a general picture on research and production activities of the sector.

Aquatic Botany (206114) [3: 60-30-30]: This course provides basic knowledge in: i/ General introduction for aquatic plants, especially algae, and factors influence their life, ii/ Some common algae groups, iii/ The role of algae in nature as well as aquaculture and algal culture systems, iv/ Harmful algae. Based on that, the student can master other specialized subjects and apply the knowledge into practice after graduation.

Water Quality Management in Aquaculture (206103) [3: 60-30-30]: The course covers the issues of the water sources used in aquaculture; physical and chemical properties and the effects of these factors on the aquatic life. The module also provides learners with knowledge of water quality management methods in aquaculture and models of water reuse or recirculation water systems. In addition to the theoretical content, the module builds case exercises on the treatment when the water quality factors fluctuate in a bad direction. The course also equips students with basic knowledge of chemical analysis, the use of test kits to analyze pond water quality parameters and water quality assessment methods.

Zooplankton and Benthos (206105) [3: 60-30-30]: The course provides students with basic knowledge on: i/ General information about zooplankton and zoobenthos, and the factors impacting on their life; ii/ The common zooplanktons; iii/ The role of zooplankton in nature and in aquaculture; iv/ The common zoobenthos; v/ The role of zoobenthos in nature and in aquaculture. Furthermore, this course will also provide students with updated information on studies and zooplankton culture as a natural feed source in Vietnam. After

the course, the students will be able to grasp other related subjects in their study program, and then be capable of applying the knowledge they learned into practice.

Ichthyology (206106) [3: 60-30-30]: The overall focus of the course is on providing knowledge about ichthyology such as external morphology, anatomy, taxonomy, evolution and geographical distribution of fish.

Specialized Biochemistry for Fisheries (206316) [2: 30-30-0]: The course includes a basic metabolism and energy of cells in aquatic animals. The major content of the course explains the biochemical reactions that take place in the aquatic animal bodies such as absorbing nutrients, eliminating substances, or exchanging nutrients and energy of the body with the living environment. For example, exchanging bioenergy, protein, lipid, carbohydrates, minerals and vitamins, and nucleic acids.

General Microbiology (203516) [3: 60-30-30]: The course is designed to provide students with general knowledge about the main groups of microorganisms (acellular agents, prokaryotes and eukaryotes) as well as cell structures and reproduction of those microorganisms. The course also introduces microbiological physiological characteristics, nutritional requirements and environmental factors that affect the growth and reproduction of microorganisms.

Physiology of Aquatic Animals (206115) [4: 75-45-30]: The overall focus of the course is on providing knowledge about mechanism of activation and functional role of internal organs in aquatic animals (physiology of blood, respiration physiology, excretion, nutrition and metabolism, reproduction…). The main animal groups that will be considered are fishes, crustaceans and mollusks. It will be useful to understanding the essence of rules, modes of regulating the activities of each organ inside aquatic animals with interaction between environmental factors and aquatic animals.

Statistics and Experimental Design (206116) [3: 60-30-30]: This course is designed to provide the students with fundamental knowledge of sampling and the use of statistics in collecting and exploring aquaculture experimental data as well as statistical hypothesis tests. The course will also introduce elements of experimental design and analysis of variance (one factor and two factors), correlation and simple linear regression. Students will also learn statistical software used in experimental data analysis procedures in the Excel and Minitab software package. The course will consist of 3-hour weekly lecture, 6-hour weekly practical and one class devoted to student presentations related to a term project assigned at midterm.

Nutrition and Feed Technology in Aquaculture (206215) [4: 75-45-30]: The course provides basic knowledge on the role of different nutrients in aquafeed and their effects on

the performances of aquatic animal species. Furthermore, knowledge and practical skills related to feed formulation and nutrient analysis techniques have also been provided through practical session.

Introduction to Aquatic Animal Pathology (206301) [2: 30-30-0]: The aim of the course on general disease of aquatic organisms is to introduce the students into the general knowledges both in the aquatic pathology and pharmacology, basic concepts of pathology and immunology, infectious and non-infectious diseases in aquatic animals.

Introduction to Fisheries Law (206420) [2: 30-30-0]: The course is designed to introduce students to the fishery law of Vietnam, by law documents guiding the law and current basic international treaties related to fishery activities including: aquaculture and fishing, aquatic products process, import and export, aquatic resources development and conservation, aquatic animal disease inspecting and control. In addition to the theoretical content, the course also provides case studies to equip learners with skills to apply the law in solving problems related to the fisheries practice.

Introduction to Aquatic Products Preservation and Processing (206520) [3: 60-30-30]: The course is designed to provide the students with general knowledge on preservation processes of aquatic raw materials and final aquatic products; processing processes of traditional aquatic products and value-added aquatic products; the methods to develop new aquatic products from raw materials

4.2.2 Elective courses - accumulated at least 5 credits

Entrepreneurship (206424) [2: 30-30-0]: The Entrepreneurship module includes terms and problems commonly encountered when young people start a business in agriculture, especially in aquaculture, the module also provides learners with the basic principles, how to plan Business plan, Canvas model, market analysis skills, skills to learn about customers, competitors or current startup models.

In addition to the theoretical content, the module builds real-world business case exercises that require students to think and handle situations. Besides, the course also equips learners with basic knowledge about agribusiness such as skills in selling or marketing agricultural products,

Aquatic Ecology (206113) [3: 45-45-0]: This course includes 2 parts, part 1- Freshwater ecology and part 2- Brackish water ecology.

Part 1 will provide basic knowledge about water environment and types of water bodies, individual life of aquatic organisms, community life of aquatic organisms, some common freshwater ecosystems.

Part 2 will provide general knowledge about estuarine ecologies, including major ecosystems and their biodiversity, dynamics in water environment and aquatic life, characteristics of soil in estuary. Details in structure, function and eco-services of estuarine ecosystems will be introduced. It will then introduce sustainable management measures for these estuarine ecosystems.

Research Methods for Fish Biology (206117) [2: 40-20-20]: This course provides knowledge in: i/ Researching – Concept and design; ii/ Method of writing research concept and research project; iii/ Researching method for Fisheries Classifying, Genetic, Nutrition, Reproduction, Diagnose disease, Toxicology. Based on that, the student can master other specialized subjects and apply the knowledge into practice after graduation.

Introduction to Fishing Technology (206402) [2: 30-30-0]: The course introduces general knowledge about fishing and fishing grounds, fishing boats, composition and structure of fishing gear, principles of fishing gear manufacturing, main fishing sectors such as trawl nets, surrounding nets, hooks and lines, gill nets, seine nets and trappings, and international and Vietnamese fishing regulations and laws.

4.3 Specialized Courses

4.3.1 Required courses

English for Aquaculture (206214) [2: 30-30-0]: The course includes scientific articles and text related to aquatic animal biology, aquaculture concepts, environmental management in aquaculture, nutrition, and general shrimp health. The course also provides glossary of aquaculture

Marine Fish Culture Techniques (206205) [2: 30-30-0]: The course provides students with an overview of marine fish farming, techniques for culture marine fish in ponds and in cages. Students are also introduced to the high economic value of marine fish farming techniques. In addition, the subject also equips students with knowledge about the environmental impacts of marine fish farming systems and management measures to minimize adverse impacts on the environment.

Freshwater Fish Culture Techniques (206216) [3: 60-30-30]: The course is designed to provide learners with operating skills and management methods for popular freshwater aquaculture systems in Vietnam, the advantages and disadvantages of each culture system, and the main factors affecting the effectiveness of these systems such as geographical, climatic, economic and human resources.

Fisheries Economics (206405) [2: 30-30-0]: The Fisheries Economics is on providing basic principles in economic, concepts those related to supply, demand and price of aquatic products. It also provides the methods for analyzing an aquatic production costs and

economic efficiency those can be used improve the ability to analyze and evaluate production management and finance in fisheries company. Furthermore, the concepts, stages and concerned issues of farming business planning process will be introduced in this course.

Fish Seed Production Techniques (206217) [4: 75-45-30]: This course is designed including basic contents on mechanisms of vitellogenesis, oocyte maturation and ovulation, and spawning in fish; factors affecting gonadal maturity and spawning of fish; principles of maturity culture, spawning induction and fingerling nursing of fish; principles of fish seed transportation; technologies and advances in fish seed production; and factors affecting and solutions improving fish seed quality. Moreover, the course also provides exercises on building technical procedures and solutions of problems in reality of fish seed production.

Crustacean Seed Production and Culture Techniques (206218) [4: 75-45-30]: Crustaceans seed production and culture course include basic knowledge on hatchery and grow-out farms of some important and valuable crustacean species in Vietnam such as black tiger shrimp, white leg shrimp, giant freshwater prawn, and mud crab. This course provides the students with awareness and skills on how to produce crustacean seeds in the hatchery. It also supports students who know how to culture the crustacean seeds in the commercial grow-out farms

Molluscan Seed Production and Culture Techniques (206219) [3: 50-40-10]: The course provides basic knowledge on biological characteristics, seed production and culture techniques of high economic value mollusk species such as green mussel, pearl oyster, oyster, clam and blood cockle. Furthermore, knowledge on other aspects of mollusk culture such as effective conservation and natural seed collection method, appropriate culture site selection, product depuration after harvesting to meet high quality and food safety standards has also been provided throughout the course.

Aquaculture Engineering (206221) [3: 60-30-30]: This course is designed to provide learners with knowledge on design methods, working mechanisms and operation of systems of canals, dams, inlet and outlet sluicegates; and on designing farming facilities of ponds, cages, recycling systems in aquaculture; treatment systems of supply water and wastewater; seed hatcheries; etc. Moreover, the course also introduces world technological advances in aquaculture engineering could be applied in accordance with conditions and current status of development of Vietnam aquaculture to ensure best exploit of potentials and competitive advantages of the country aquaculture sector.

Field Practice for Freshwater Aquaculture (206814) [4: 120-0-120]: The course includes practical content on techniques and management of production of freshwater

aquaculture products of high economic value. Through internships at production facilities, students will improve practical skills, practical experience and update technical advances in production, helping students to actively apply in production practice production as well as research in the field of freshwater aquaculture.

Shrimp Diseases (206307) [3: 60-30-30]: The course includes contents describing diseases that occur frequently in shrimp cultured in Vietnam, Southeast Asia and around the world. In particular, the causes of disease, clinical signs, epidemiology, diagnostic methods, and disease control and prevention measures applied to farmed shrimp are specifically mentioned for each disease. This course also provides methods for evaluating shrimp health, checking for lesions, and the presence of common pathogens in shrimp as well as water environment.

English for Aquatic Animal Pathology (206315) [2: 30-30-0]: The course includes fundamental and practical knowledge related to technical English applied in aquaculture and aquaculture pathology.

Fish Diseases (206319) [4: 75-45-30]: The aim of the course on fish diseases is to introduce the students into the modern knowledges both in the infective fish diseases and environmentally and farming technologically influenced health condition of fishes.

After a brief introduction into the anatomy and physiology of farmed fishes, detailed information on infective (viral, bacterial, fungal, parasitological) and non-infective diseases are going to provide in detail.

Field Practice for Brackish water and Marine Aquaculture (206815) [4: 120-0-120]: The field practice for brackish water and marine aquaculture includes practice on techniques and management of the valuable aquatic animals in the hatcheries or grow-out farms. Through internships at production facilities, students will improve practical skills and experience, and update technical advances in production, helping students to apply actively in production practice as well as research.

4.3.2 Elective courses - accumulated at least 9 credits

Fisheries Extension (206406) [2: 30-30-0]: The course is designed to provide learners with basic knowledge about concepts, approaches and methods for effective transfer of technology from its source of origin (research) to ultimate users (the farmers) and securing its adoption

Health Management of Aquatic Animals (206312) [2: 30-30-0]: The course is designed to introduce students to the concepts of disease in populations, the major aquatic disease causing pathogens, the risks that may address impacts on aquatic animal health and the options for control. The course is specifically tailored for the student to understand the

biosecurity plan and implement it into practice, to identify and diagnose common diseases related to inappropriate management.

Fisheries Production Management (206421) [2: 30-30-0]: The fisheries production management course equips students with the basic principles of management in production. The course provides learners some content such as methods of forecasting production demand, identifying locations for building businesses, material management, inventory management, etc. In addition, the course also provides case studies, demonstrates for production management activities and practical experiences.

Aquatic Resources Management (206426) [2: 30-30-0]: The course introduces general issues on fisheries resources and environment, biological and socio-economic multi-factor relationships in fisheries resource management. The module also provides assessment methods, tools and measures for managing and management decision making of fisheries resources.

Ornamental Fish Diseases (206313) [2: 45-15-30]: The aim of the course on ornamental fish diseases is:

- To introduce the students in a general information of ornamental fish diseases and housing technologically influenced health condition of ornamental fishes.
- To provide detailed information on infective and non-infective diseases in culture of ornamental fish.

Planning and Management of Fisheries Development (206404) [2: 30-30-0]: This course will introduce the status of production and management in aquaculture; concepts and requirements for planning and sustainable development in aquaculture. It will then introduce the principles in conducting a planning project for aquaculture development; Tools and methods to be used in conducting a planning project. Finally, it will provide the general process and detail steps in planning an aquaculture project.

Aqua-business Management (206427) [3: 45-45-0]: The module equips students with the basic principles of production and business management of fishery products. In addition, the basic principles of inventory management, quality management, the process of making business decisions and business strategies will be discussed in this subject. Methods of analyzing production costs also help students improve their ability to analyze, forecast demand and consider the basics of financial management in fisheries corporations. Besides, some concepts of quality management are also introduced in this course to help students improve their knowledge of comprehensive quality management in fisheries business and production.

Environmental Impact Assessment in Fisheries (206429) [3: 60-30-30]: The main contents of this course comprise basic knowledge on environmental impact assessment, including concepts, compositions and states of environment; environmental impact assessment (EIA) and its significance; a requirement and project classification for EIA; general process to run an EIA; requirement for structure and content of an EIA report, particularly into aquaculture field. Additionally, it also provides some related regulations in reviewing and evaluating an EIA report. Finally, a field trip will be organized for students to learn how an aquaculture sector sets up their environmental management system; and they will practice developing an EIA proposal for assessing the impacts of a real-world production.

Applied Genetics in Aquaculture (206210) [2: 30-30-0]:** The course includes content related to genetic materials, the law of genetics, variation of genetic material in aquatic animals, methods of crossbreeding and selection in fish, and the modern molecular genetic techniques applied in fisheries. In addition, the course also provides a number of published research results related to the field of genetics and breeding of aquatic species to illustrate the achievements and practical experiences. Thereby, students will gain background knowledge and fundamental knowledge related to the key areas of genetics and genetic applications in fisheries.

Ornamental Fish Culture Techniques (206220) [2: 40-20-20]:** The course is designed to provide learners with knowledge about: an overview of the situation of ornamental fish farming in the country and in the world; biological, reproductive, nutritional, distribution and habitat characteristics of freshwater and marine aquarium species; the farming and breeding techniques for some popular ornamental fish species. The course also provides theoretical and practical foundations in the design and operation of aquariums.

Applied Microbiology in Aquaculture (206303) [2: 30-30-0]:** This course will provide students with knowledge in microflora of healthy aquatic animals and water environment, beneficial microorganisms with applications in aquaculture and pathogenic microorganisms. The course also equips students with basic applications of microbiology in the study of aquatic pathogens, biological products in aquaculture such as probiotics, vaccines and immunostimulants.

Drugs and Chemicals in Aquaculture (206310) [2: 30-30-0]:** This course will provide to students with basic knowledge about principles of application of chemicals and drugs in aquaculture. In addition, this course also provides students with concepts, pathways, processes, and metabolic control principles in aquaculture ponds and on the

animals. These knowledges will establish a foundation for students and help them master other subjects as well as allow them applying the knowledge into practice after graduation.

Fisheries Marketing (206409) [2: 30-30-0]:** This course equips learners with basic knowledge relating to marketing, such as: marketing principles in business, methods of research and analysis market, marketing strategies, some concepts on international marketing to help assess global market issues. Accordingly, learners develop basic marketing knowledge and understand the applications of marketing in business. The students will have skills to analyze marketing in an organization or industry and building an appropriate marketing strategy for companies.

Quality Assessment for Aquatic Products (206513) [2: 30-30-0]:** The course introduces students the concepts and methods of qualitative and quantitative assessment of aquatic products according to Vietnamese and international standards based on the three groups of criteria including microbiological tests, chemical test and sensory evaluation. In addition, the course also updates several innovative methods that are not in the list of standards but are now commonly applied in quality assessment for aquatic products.

4.3.3 Elective courses - accumulated at least 12 credits

Minor Thesis (206904) [6: 90-0-90]: Minor thesis is considered an important scientific work of students, in order to evaluate the ability to apply integrated knowledge accumulated during the training process; thinking and reasoning skills; self-study and self-research attitude of students in order to solve the requirements of applying theory to practice in aquaculture activities. Minor thesis are organized with an internship period of 10-15 weeks. The content of the minor thesis is structured into four main parts, including: (1) Introduction, (2) Research methodology, (3) Results and discussion, and (4) Conclusion and recommendations.

Thesis (206905) [12: 180-0-180]: Training students to plan, develop and complete specific research in the field of aquaculture as well as enable students to synthesize, practice and perfect all knowledge, experience and skills for flexible access to future employment.

Special study on Aquatic Resources Management (206910) [2: 30-30-0]: The study provides students with the skills to write an overview research report in the field of fisheries resource management, including identifying issues and priority topics, assessing the significance and urgency of the research, define special study objectives, literature review, analyze and propose solutions.

Special study on Diseases of Aquatic Organisms (206911) [2: 30-30-0]: The course provides student with knowledge and methodologies for writings about topics related to

aquaculture pathology. Student will be guided with methodology for literature reviews of relevant issues. All references will be summarized, organized, and rewritten into a complete document summarizing analyzing the published results

Special study on Aquatic Animal Health Management (206912) [2: 30-30-0]: In the Special Study on Aquatic Animal Health Management course, participants are required to write a report in order to explore, synthesize, analyse research data, and propose their new research idea related to the concepts of disease in populations and disease diagnostics, the risks that may address impacts on aquatic animal health and the options for control.

Special study on Fisheries Trading (206913) [2: 30-30-0]: The Special Study on Fisheries Trading module equips students with the skills of making a general research report in the commercial fisheries field, including determining priority problems and topics, evaluating the importation, urgency and meaning of topics, defining thematic objectives, reviewing documents, analyzing and propose solutions.

Special study on Aquatic Products Research and Development (206914) [2: 30-30-0]: This special study equips students with skills in researching, searching and synthesizing knowledge from literature to develop new seafood products. In addition, the special study also helps students to identify objectives, content, and concerned issues in developing new seafood products.

Special study on Aquatic Products Hygiene and Safety Assurance (206915) [2: 30-30-0]: This special study is designed to equip students with knowledge, skills and approach to conduct scientific research on hygiene and safety of aquatic products. In addition, this course also helps student to be able to apply knowledge to solve practical problems in food hygiene and safety of aquatic products

Special study on Aquatic Products Quality Assurance (206916) [2: 30-30-0]: This special study equips students with skills in researching, searching and synthesis knowledge from literature to manage and ensure the quality of aquatic products. In addition, the special study also helps students to identify objectives, content, concerned issues and building the approach to manage and ensure the quality of aquatic products.

Special study on Aquaculture Techniques (206917) [2: 30-30-0]: This course is designed to train students to be able to search, select, and synthesize documents related to farming techniques, culture systems of different value aquatic species; update advanced technologies in the field of aquaculture. In addition, students are also equipped with skills to organize, write and present thematic reports. Thereby, students are trained in skills and responsibility for lifelong self-study and research.

Special study on Aquatic Seed Production Techniques (206918) [2: 30-30-0]: This subject helps students to be able to look up, select and synthesize references related to valuable aquatic species seed production techniques; It also updates technical advances and modern science of seed production from domestic as well as foreign sources. In addition, students improved their organizing, writing, and presenting skills under the evaluation committee. Thereby, students can be active in self-study and research.

DEAN

Assoc. Prof. Dr. Nguyen Nhu Tri